

Galaxy

SCIENCE FICTION

MAY 1957

35¢

WHO'LL OWN
THE PLANETS?

by

WILLY
LEY

•

Time

in the Round

by

FRITZ
LEIBER

•

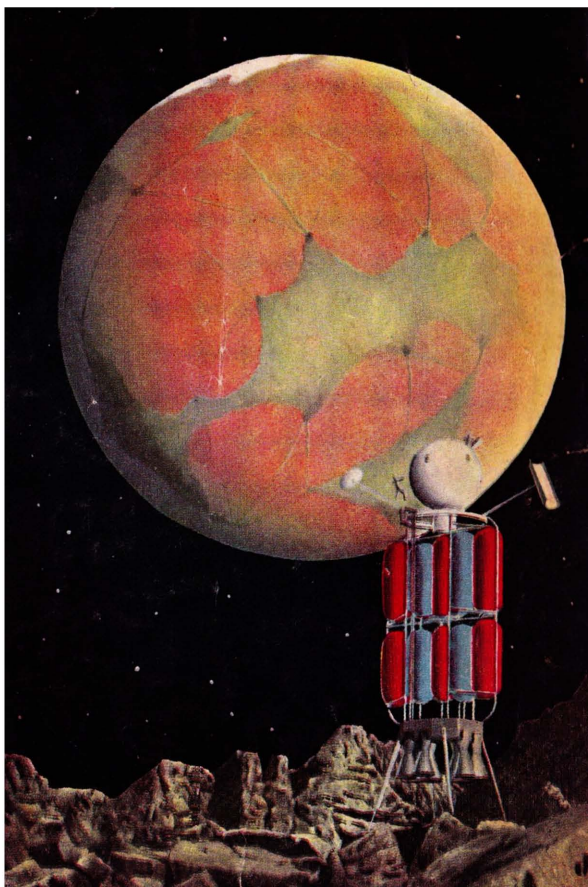
Survival Kit

by

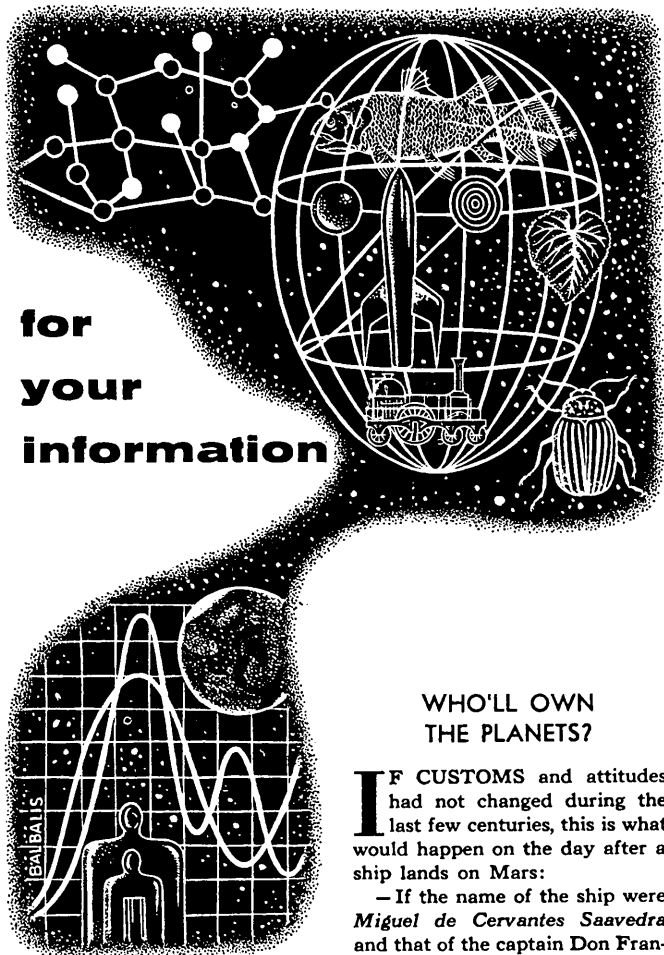
FREDERIK
POHL

—

AND
OTHER STORIES



**for
your
information**



WHO'LL OWN THE PLANETS?

IF CUSTOMS and attitudes had not changed during the last few centuries, this is what would happen on the day after a ship lands on Mars:

— If the name of the ship were *Miguel de Cervantes Saavedra* and that of the captain Don Fran-

cisco de Quintana y Molino, there would be a procession with banners of the cross around the landing site, two masses would be said, and in conclusion of the ceremony, a cross would be erected . . .

— If the name of the ship were *Dom Henrique* and the name of the captain Joao Dias, there would be the erection of a cross, a mass would be said and, in conclusion, a monument with a coat of arms would be placed . . .

— If the name of the ship were *Ilya Murometz* and that of the captain Vladimir Ossipovitch Kosmodemyanski, there would be a religious ceremony culminating in the ceremonial burying of copper shields with a coat of arms . . .

— If the name of the ship were *Queen Elizabeth* and that of the captain Sir Cecil Hawkins, there would be a brisk service and the captain would perform the “turf and sprig” ceremony, taking a handful of soil and any small plant in reach to take home with him. Then the British flag would be hoisted . . .

— And if the name of the ship were *Siegfried*, commanded by Captain Wolfgang von Greiffenklau, there would be an even brisker service. Then everybody would stand at attention while the German flag is being hoisted. Possibly the captain would stick his dress saber into the ground,

or else (another tradition) pierce his own cap with it.

I don't know what would happen if the ship were named the *Robert H. Goddard* and the captain F. Warren Smith, for all the customs mentioned had gone out of use at the time the thirteen states decided to be independent. But these were the actual customs for taking possession of an island or a coast.

Needless to say, none of these ceremonies would carry any legal validity nowadays and the International Court at The Hague wouldn't pay the slightest attention to even the most elaborate ceremony if the participants therein pack up and blast off for home at a later date.

THE law . . . Now just a moment. There is no space law yet, is there? The answer to that question is a clear “no” if you mean “legislation” when you say “law.” As Rear Admiral Chester Ward said in a lecture on space law during the eleventh annual meeting of the American Rocket Society in November, 1956: “It is a fundamental principle of law-making that you can't legislate without facts. That principle applies just as well to the law of space as it does to the law that governs our actions here on the surface of the earth.”

Since there are no “facts” yet

—that is to say, no spaceships with known performance characteristics and, by implication, performance restrictions—there can be no legislation.

But just because there are no such “facts” yet, the term “law” may be employed to mean what would otherwise be called a legal principle or a legal attitude. And that certainly exists. I have listened to about half a dozen lectures on the foundations and principles of space law during the last half dozen years—they were not evenly spaced, though—and found enough agreement between the various experts to make a resumé possible.

The earliest dissertation on space law saw print in 1932. Its title was just that: “The Law of Space,” but in German *Das Welt-raum-Recht* and it was written by a Dr. Vladimir Mandl, who was then a practicing lawyer in Pilsen, Czechoslovakia. I freely admit that I hadn’t looked at it since 1932 when Dr. Mandl sent me a copy and I have just read it to see what he had to say then.

Well, the net yield was tiny, for Dr. Mandl devoted most of his small book to investigating such legal problems as liability for accidental damage, etc., etc., and all that with special reference to German law. But he did say that space outside the atmosphere should be regarded as an area

without existing or possible sovereignty, a point on which all later legal writers fully agreed.

The idea is very simply that open space is compared to the open sea. That no nation has, or can have, sovereignty over the open sea is a legal principle that has been firmly established for centuries.

WE tend to think this is so obvious that it need not be mentioned, but there was a time—best nailed down as the time in which Columbus lived—when countries and even cities claimed ownership and sovereignty over oceans.

The Republic of Venice said it owned the Adriatic Sea. The city of Genoa countered this by owning the Ligurian Sea. Portugal claimed the Indian Ocean and the South Atlantic as hers, while Spain was content to own the Pacific Ocean (and the Gulf of Mexico). And the only reason that the Hanseatic League never said it owned the North Sea and the Baltic was that England, Norway and Denmark would have put in claims for the North Sea, too, and Denmark, Sweden and the countries of the eastern Baltic might have had strong opinions about the sole proprietorship of the Baltic.

Crowding sometimes has useful aspects.

ARGUMENT that the high seas should be free for the lawful use of all was first presented by the Dutch jurist Grotius, who is universally recognized as the "Father of International Law." But the fact that no nation, or organization of countries like the United Nations, has sovereignty over the high seas certainly does not make every ocean a lawless place. It developed its own law, based on practices which navigators found either efficient or convenient, and which were later formulated.

The statement that the laws which govern the sea should be extended to apply to interplanetary space was voiced—for the first time, as far as I know—by Oscar Schachter, deputy director of the Legal Department of the United Nations, on the occasion of the First Space Travel Symposium at the Hayden Planetarium in New York City in October, 1951—appropriately enough, on Columbus Day.

But in order to gain the open sea, you have to traverse coastal waters, and in order to gain open space, you have to traverse the atmosphere. As regards coastal waters, the legal situation is clear; the problems were thrashed out and settled a century ago. The first three miles of ocean are considered to be under the sovereignty of the country which

exercises sovereignty over the shoreline.

It has often been said that this figure of three miles was accepted because that used to be the range of the old coastal batteries. This sounded like a logical and convincing reason. Unfortunately, one could draw the conclusion from it that things belong to you for as far as you can shoot. That kind of reasoning would lead to declaring that "might is right" even legally.

Personally, I never quite believed that the three-mile zone had been derived from the range of the coastal guns, because a three-mile range did not become possible until many years after the limit had been accepted. And recently I learned that "three miles" was just a more modern way of expressing an older measurement, namely, one marine league.

There is something else about this three-mile zone which strikes me as either odd or significant—I don't know which. If what follows should be just a coincidence, it is a rare one.

There is a simplified formula which says you multiply the square root of h by 1.17 and you get D . The letter h stands for elevation above sea level and must be expressed in fact. The result D must be read in nautical miles and gives you the distance of the

horizon at sea. If you take h to be six feet, the result is three miles (not nautical miles).

In other words, the three-mile limit coincides with the actual distance of the horizon for a man standing at the seashore. Remember that his feet will not be at actual sea level but a few inches above it. The refraction in the atmosphere is included in that conversion factor of 1.17.

TO RETURN to the legal aspects: most countries have accepted the three-mile limit and the United States recognizes no other, although there are a few countries which, for their own purposes (such as prosecution of smuggling), claim sovereignty over a longer distance, usually ten kilometers.

But while the countries "own" that much of the ocean, their ownership is not absolutely exclusive. There are exceptions. If a vessel, in order to pass from one tract of open sea to another one, has to navigate through sovereign waters, it can do so—it has the right of "innocent passage." (Whether naval vessels, in time of peace, have the right of innocent passage is disputed, but in time of peace, this problem is usually circumvented by prior agreement.)

When lawyers say "innocent passage," they usually mean

freighters and passenger liners, but it also applies to rescue missions or scientific expeditions.

Now we come to the main difficulty. It would be nice if one could reason that, since space is analogous to the open sea, the atmosphere is analogous to the three-mile zone, with the right of innocent passage for all. If we had had peace ever since the invention of the airplane, one probably would reason that way. But there are two complications, each one major.

The first is the very obvious right of self-defense, and there are more military aircraft than passenger liners and air freighters.

The second is that no figure has so far been universally accepted as the limit of the atmosphere.

When you ask a scientist what seems to be a simple question, "How deep is the atmosphere?" he will look somewhat unhappy, draw a deep breath, stall by lighting a pipe, cigar or cigarette and say: "What characteristics do you have in mind?" The problem is that you still get some effects, like the reflection of short radio waves, several hundred miles up. On the other hand, it seems unlikely that you'll find noticeable air resistance, even at speeds of several miles per second, above perhaps 120 miles.

About two years ago, in a discussion of this difficulty, a law

expert said that the *legal* limit might be determined by the height at which one can actually fly. Unfortunately I could not help him there. Jets and other air-breathing engines won't be able to go higher than, say, 70,000 feet.

But a large plastic balloon can go to 125,000 feet and a rocket-propelled plane still higher. Whether these "fly" or not is purely a question of definition. Is "flying" just moving through a space which still contains a little atmosphere, or is the term restricted to those altitudes where you still obtain some aerodynamic "lift"?

This, too, remains to be decided.

OUR next step in disentangling the legal problem is obviously to find out what is the "law" in the air, the air in which we are now flying if we want to get from one city to another in comfort and with dispatch. Here the situation is sad, partly because of past experiences, partly because of old aspects.

The Romans held that the landowner also owned the air above it "to the sky." This idea was perpetuated in English common law, which said (still in Latin): *Cujus est solum ejus est usque ad coelum*, which later was expressed in English as: "He who owns the soil, or surface of the

ground, owns, or has an exclusive right to, everything which is upon or above it to an indefinite height." (I don't know what practical importance that had, except when it came to the ownership of a bird shot on the wing.)

This personal and private ownership of the air and the sky above it was granted by the sovereign and "could be asserted only against other private citizens; the sovereign never parted with its paramount right to control the space above its territory." (Quotation from Andrew G. Haley's lecture *Basic Concepts of Space Law*, presented at the Annual Meeting of the American Rocket Society in Chicago in November, 1955; published in the society's journal *Jet Propulsion*, November issue, 1956.) In short, the attitude was the same as with the oceans.

As long as there was no human flight at all, or, at a later date, merely an occasional balloon, there was no legislation about the air. Lawyers say: *Minima non curat praetor*, which one may translate as: "Minor matters do not concern legislators." Not only was there no legislation, there was not even any theoretical reasoning.

The invention of the airplane changed this; in fact, one man was actually ahead of events. In 1902, at a meeting of the Insti-

tute of International Law, an expert named Paul Fauchille submitted a draft of a proposed convention on the regulation of aerial navigation. According to Haley, this draft was approved in a modified form in 1906.

Said Haley: "The convention would have made the air free to commerce and travel, just as the sea. The provision for national security measures, while vague and indeterminate, was a reasonable reservation of sovereign rights to protect against civil negligence or hostile action through the air, but it was not intended that any nation should usurp the air completely. The proposal was never implemented in an international convention."

I presume that it was still a case of *minima non curat praetor* with the few airships and planes which were around. At any event, nobody thought of prosecuting Blériot when he flew the English Channel and, so to speak, violated English air space.

BUT then the First World War came and it was one of the neutrals (generally a peaceful country in recent centuries) which had to defend vigorously the idea of sovereignty over its air space. This was Holland, lying as it does directly on the air route between England and Germany.

Of course there were violations. A couple of German zeppelin airships drifted off course in foggy weather (zeppelin ships, as a matter of principle, hid in drifting clouds to avoid being spotted, a method that may protect you but does not improve your navigation) and partly disabled seaplanes had to land in Dutch waters.

Right after the First World War, in October, 1919, the Paris Convention for the Regulation of Air Navigation was signed and "freedom of the air" was completely ruined in the very first article of this convention: *Les Hautes Parties Contractantes reconnaissent, que chaque Puissance a la souveraineté complète et exclusive sur l'espace atmosphérique au-dessus de son territoire;* "The High Contracting Parties recognize that every Power has complete and exclusive sovereignty over the air space above its territory."

Note the "complete and exclusive," and, of course, this included sovereignty over the three miles of ocean offshore. In practice, this complete and exclusive sovereignty was somewhat limited by rules of conduct.

The rules established, on the one hand, the right of innocent passage for non-military aircraft, and, on the other hand, the right to set up "prohibited zones" which

could not be flown over. But—and this turned out to be the worst feature in the long run—these rights applied only to those countries that signed the convention. Nations which were signatories had the right to make separate agreements with nations which were not, but in reality they mostly refused to make such agreements and spent their energy in keeping the non-signatories out.

As for the United States, its representatives signed the convention with the provision that American aircraft could fly over American "prohibited zones." But the Senate did not ratify the convention, so the United States ceased to be a signatory. However, we observed the rules just the same and finally made a general Western Hemisphere right-of-innocent-passage agreement.

There was a welter of additional conferences dealing with all kinds of side issues—such as cases of infectious disease discovered on an international flight—and then the Second World War came. Again each nation, and most especially the neutrals, had to assert all their rights vigorously.

NEAR the end of the war, another important convention on civil aviation took place, this time in Chicago. It ended in December, 1944, but again the main

article read the same, almost word for word, as the first article of the Paris convention. Something new had been added, however: "No aircraft capable of being flown without a pilot shall be flown without a pilot over the territory of a contracting state without special authorization by that state." This was the first recognition of the existence of guided missiles.

The possibilities and capabilities of aerial warfare being what they are, it is both natural and logical that every nation insist on absolute sovereignty over its "air space." The real trouble is that there is no definition of what is "air" in the term "air space." Since there is no natural upper limit to the height at which "aircraft capable of being flown without a pilot" (read: missiles) can fly, one might argue that there is no upper limit to the "air space." In the light of astronomical facts, this argument is plain nonsense.

As C. Wilfried Jenks of the International Labor Office in Geneva wrote in the *International and Comparative Law Quarterly* (January, 1956):

"Any projection of territorial sovereignty into space beyond the atmosphere would be inconsistent with the basic astronomical facts. The rotation of the earth on its own axis, its revolution around the sun, and the motions of the

sun and the planets through the galaxy all require that the relationship of particular sovereignties on the surface of the earth to space beyond the atmosphere is never constant for the smallest conceivable fraction of time. Such a projection into space of sovereignties based on particular areas of the earth's surface would give us a series of adjacent irregularly shaped cones with a constantly changing content. Celestial bodies would move in and out of these cones all the time. In these circumstances, the concept of a space cone of sovereignty is a meaningless and dangerous abstraction."

Admiral Ward, in his recent lecture, after saying in different words what I just quoted from Jenks, could indicate a way out:

"Professor Cooper, and other distinguished authorities, have pointed out that our development of a law of outer space is not restricted by our present agreements affirming each nation's sovereignty over the air, or the 'air space,' above it. These agreements relate strictly to the 'air space.' They apply only as far as the upper limits of the region in which air is sufficiently dense to support the flight of conventional aircraft—that is, those aircraft supported through reaction with the air. We are therefore free to develop a law of outer space, to

apply in areas above this region of relatively dense air, without restriction from our existing agreements relating to 'air space.' The lawmakers wait only for the physical facts of space to be supplied by the explorers, the scientists, the mathematicians and the physicists. With the physical facts in hand, we can attempt to set the upper limits of national sovereignty."

Admiral Ward went on to state that such an upper limit of sovereignty would not hamper national defense. The three-mile limit also does not hamper our naval operations and other defense measures at sea.

LET us say now that agreements have been reached, signed and ratified which set the upper limit of the "air space" at 50 kilometers, which is almost precisely 31 miles. Then we would get the following picture:

Up to a height of 31 miles, each nation has the "complete and exclusive sovereignty" first accepted in the Paris convention. Above that, there would be a zone with the right of innocent passage. For scientific reasons, this zone should not be lumped with "open space," because some physical phenomena due to a highly attenuated atmosphere can still be observed.

Open space may then be said to begin at a height of 250 kilo-

meters or 155 miles (I am putting kilometers first because, by Act of Congress, the customary American standard measurements are defined in terms of metric measurements), so that there are three legal zones.

The bottom zone, with its complete and exclusive sovereignty, would not compare to the three-mile zone but rather to rivers and inland lakes. The next zone, from 50 to 250 kilometers, would be comparable to the three-mile zone. And space above 250 kilometers would be comparable (better: analogous) to the high seas.

But there is still an amusing wrinkle—these three zones would logically be in existence *only* above land. They would not exist for three-quarters of the Earth's surface, for over the high seas, the freedom of the seas would extend into space with no legal zone in between. Or else you may say that the freedom of space would end where your ship gets wet with salt water. Then you are in the free and open seas.

Legal discussions may be interesting, but how does all this apply to the coming satellite shots? By an interesting combination of natural facts, these satellite shots happen to be about as "legal" as they can possibly be.

The Vanguard rockets, the satellite carriers, will be fired from

Patrick Air Force Base in Florida. American-made, they take off from American soil and, for a time to be measured in seconds, they will be in American air space above American waters. When they leave American air space, they are in the free air over the free ocean. By the time land is below again (the southern part of Africa), they have passed out of any air space and are in free space.

Of course, they are legal in another sense, too. They are part of the International Geophysical Year. Some sixty nations have not only not voiced any objections, but have promised support and assistance in observing the satellites. So that's that.

NOW how about that ship that lands on Mars and its captain who takes possession with or without ceremonies? In the first place, it is possible—even probable—that an agreement might be reached in the meantime that all "land" beyond the earth will be under the jurisdiction of the United Nations, unless inhabited by indigenous intelligent and reasoning beings. (In the latter case, naturally, *they* would have sovereignty.) All rights, including mining rights, if any, would take the form of concessions, leases or licenses from the United Nations.

But suppose it is not a case of the United Nations — which really means nations acting together instead of separately — but still a case of separate nations, generally at peace. There are some interesting analogies in the past and I'll quote Bouvet Island as an example. It is a small island, situated several hundred nautical miles to the SSW of the southern tip of Africa. The island itself is roughly circular, with a diameter of about five miles measured east to west and about half a mile less measured north to south. It is essentially just one large dead volcano, completely covered with glaciers.

Bouvet Island was discovered in 1739 by the French captain Lozier Bouvet. He thought it was just a northern cape of a much larger southern continent and named it *Cap de la Circoncision*. He made no legal claims. Since the area where the island is located is also characterized by the worst climatic conditions possible — frequent storms, long-lasting fogs, drifting ice — the island was "lost" for many years.

It was found again by the English captain James Lindsay in 1808. He tried to land but could not; by sailing around it, however, he established that it was an island. In December, 1825, the English ship *Sprightly* under Captain George Norris found the is-

land, sailed around it, and Captain Norris took possession of it (from shipboard) for the United Kingdom in the name of King George IV.

There followed another period of uncertainty whether the island existed at all, but in November, 1898, the German oceanographic expedition with the steamer *Valdivia* found it again. The Germans decided that landing would be very difficult and would not accomplish anything anyway, so they did their charting and mapping from aboard their comfortable steamer. And although they named the largest glacier they could see the *Kaiser Wilhelm Glacier*, they had no aspirations as to ownership. They were merely establishing the precise location and size of this British possession.

BUT in December, 1927, the Norwegian vessel *Norvegia* under Captain Axel Hornvedt reached Bouvet Island. A landing party went ashore and took formal possession for Norway in the name of King Haakon VII. England objected, pointing to its Captain Norris. England lost the dispute, for the men of the *Norvegia* had actually landed.

But it cannot be denied that Norway's title to the island, acquired in 1928, is none too solid. They did land, which was deemed

more important than prior discovery from a distance. But they have never exercised their sovereignty. And this has come to be an important point; if somebody else sneaked in during the antarctic night and established a colony, he might win out over Norway, since Norway has obviously been negligent in asserting its rights by possession.

The history of Bouvet Island may, in the future, become famous because of citations in legal arguments. In the meantime, it indicates that nobody will be able to "own" a planet by just saying so.

IF MERE discovery established ownership then the naked-eye planets — Mercury, Venus, Mars, Jupiter and Saturn — would be common property. They were discovered by the Babylonians who left no heirs and assigns. Our moon would be community property, too.

Otherwise, Germany and England would fare best, with the largest chunks of celestial real estate: Germany could claim Neptune and England Uranus. But Uranus was discovered by

Herschel, who was German-born, and though he made the discovery from English soil, he may not yet have been an English citizen at that moment, which would produce an interesting legal problem.

The Netherlands would get Titan, Saturn's largest moon. Italy would get the four largest moons of Jupiter and possibly several of the smaller moons of Saturn, depending on whether their discoverer, Cassini, was still an Italian or already a Frenchman when he found them.

England, in addition to Uranus, would get all the four large moons of that planet, the larger moon of Neptune and two of the minor satellites of Saturn. The United States would get the two moons of Mars, a handful of the minor moons of Jupiter, one minor moon of Saturn, the smallest moon of Uranus, the smaller of the two moons of Neptune and the planet Pluto. Of course, practically all of us would "own" at least a few asteroids.

But remember, discovery by itself does not count. You've got to land on your asteroid — and stay there — to make it legal.

— WILLY LEY

